AMENDMENTS TO THE SPECIFICATION:

On pages 3-4, please replace paragraph [0014] with the following amended paragraph:

The perception of color is attributed to the differing spectral sensitivities of the light sensitive receptors. The trichromacy of color sensation implies that many different spectral distributions can produce the same perceived color. Such equivalent stimuli, which produce the same perception even though they are physically different spectral distributions, are called metamers, and the phenomena metamerism. For example, it is known that the perceived color of an object can change quite markedly when the object is moved from incident daylight into incident artificial light. The spectrum of the illuminating light source is also known to have an effect on the perceived colors of a printed image in spite of the considerable physiological compensation that the eye makes for differences in illumination. Light sources of differing relative spectral power distributions are therefore known to have different color rendering properties: for example, light sources which emit very ~~narrow-band~~ narrow band, or almost monochromatic, light are considered to render colors very poorly.

On page 7, please replace paragraph [0024] with the following amended paragraph:

In another embodiment of the contemplated encoding, the mapping of each source image is instead performed according to determinations described herein for compensating the effect of one or more of the following on the composition, rendering, or demultiplexing of the composite image: (a) the trichromacy of human visual response to colorant/illuminant interaction; (b) the spectral characteristics of the colorants selected for rendering the composite image, such spectral characteristics especially comprehending the interaction of plural colorants when such are combined on the substrate, and (c) the spectral characteristics of the ~~narrow-band~~ narrow band illuminant(s) that will be used to illuminate the composite image for recovering the source image(s).

On page 23, please replace paragraph [0088] with the following amended paragraph:

Embodiments of the present invention accordingly exploit the interaction between certain narrowband illuminants and their corresponding (complementary) colorants (especially the colorants typically used for printing), and the manner in which the eye detects images illuminated with illuminants having narrow_band spectral power distributions. The methodology described herein may be generalized to apply to an arbitrary number of illuminants and colorants, and for the purpose of simplicity the invention is described with reference to the cyan, magenta, yellow, and black colorants commonly used in color printing applications, and to the ~~narrow-band~~ narrow band red, green, and blue illuminants commonly generated by CRT-based light sources. This description thus makes reference to the handling of monochromatic and polychromatic source images encoded according to an array of colorants such as the CMYK color primaries. However, it will be apparent to one of ordinary skill in the art that there are alternative spectral schemes to be employed in the spectral multiplexing of the invention. An alternative would include a color system that employs primary colorants other than CMYK for color representations, such as systems that use RGB primaries or high-fidelity colorants such as orange and green.

On page 23, please replace the paragraph [0089] with the following amended paragraph:

The general theory of the invention may be understood with reference to a rendering device in the form of a color hardcopy output device, such as a printer, and to a mathematical framework that employs nomenclature similar to that used in conventional color imaging. Consider a color hardcopy output device with M colorants. Prints from this device are to be viewed under N different illuminants, $\{L_i\}_{i=1}^{N}$. The luminance characterization of the ~~output device~~ printer under the $\underline{N}$ $\underline{\text{illuminants}}$ $\{L_i\}_{i=1}^{N}$ ~~K viewing lamps~~ is given by the relation between the control values $\{A_j\}_{j=1}^{M}$ used for each of the M colorants at a given pixel location and the luminance produced at the given pixel location under each of the N illuminants. This can be denoted as the set of N functions, where $i = 1, 2, \ldots N$:

$$f_i(A_1, A_2, \ldots A_M) = \text{luminance of region}$$
$$\text{with colorant control values } A_1, A_2, \ldots A_M \text{ under } i\text{th illumination } L_i$$

On page 28, please replace the paragraph [00124] with the following amended paragraph:

Therefore the overall visual density under green illumination corresponds to a constant background density of ~~K^G~~ $\underline{q^G}$ with the spatially varying density pattern of $d2_C{}^R(x,y)$ superimposed. This spatially varying pattern is the one that is seen under red illumination and should therefore represent the second multiplexed image that is to be seen under green illumination.

On page 25, please replace the paragraph [00137] with the following amended paragraph:

Once the source images to be multiplexed have been mapped to the achievable gamut G, the problem of reproduction reduces to the determination of the control values for each of the M colorants for each pixel. This corresponds to an inversion of the system of equations in (1) and in a manner similar to color calibration, the inverse could be pre-computed and stored in N-dimensional look-up tables (LUTs), with one LUT ~~one~~ per colorant (or alternately, a single N-dimensional LUT with M outputs).

On page 38, please replace the paragraph [00168] with the following amended paragraph:

The system of linear equations can be solved to determine a value of $\mathbf{d}$, which provides the desired luminance values under the different illuminants (corresponding to the multiplexed images). The individual components of $\mathbf{d}$, i.e., the $d_j(B_j)$ values can then be used with the visual density response for the jth colorant under the jth illuminant to determine the control value corresponding to the jth colorant, i.e., B_j. This process is analogous to inverting a one-dimensional tone reproduction curve (1-D TRC) ~~1-D TRC~~. Repeating the process for each colorant provides the complete set of colorant control values required by $\{B_j\}_{j=1}^{M}$ that produce the desired set of luminance values under the different illuminants.

On page 41, please replace the paragraph [00178] with the following amended paragraphs:

Accordingly, this illuminant-neutral GCR technique may be implemented with respect to the locations of deposited colorants in a rendered composite image that will appear dark when subjected to each of the complementary illuminants for which the composite image is encoded and rendered.

[00178.1]   Consider the perception of image density in a rendered composite image illuminated by white light. For example, black can be used to replace a portion of the cyan colorant deposited in the areas of the common darkness that appear under red light; black can be used to replace a portion of the yellow colorant deposited in the areas of common darkness that appear under blue light. As a result, the common areas of darkness become more perceptible under broadband light conditions.

On page 41, please replace the paragraph [00179] with the following amended paragraph:

~~For example, consider a composite image that has been encoded and rendered according to cyan and yellow separation images. Black can be used to replace a portion of the common density of cyan for recovery of a source image under red light, and black can be used to replace a portion of the common density of yellow for recovery of a source image under blue light.~~ Common image density produced with this black component is more perceptible under white light than the same image features rendered only with cyan and yellow.

On page 55, please replace the paragraph [00234] with the following amended paragraph:

The controller 150 may be constructed as in the form of a manually-operable illuminant selector switch. Alternatively, as illustrated, the controller 150 may be provided in the form of a computer-based control device having an interface 156 connected to source 160, which offers programmable control of the operation of the illuminant source 160. The controller 150 may thus be operated to cause selective activation and deactivation of the illuminant source 160 so as to provide one or more selected fields of illumination 161, 162. Such control may, for example, the accomplished via manual operation of the illuminant source 160 by a human operator, or by programmable control afforded by a computer or similar means.

On page 55-56, please replace the paragraph [00237] with the following amended paragraph:

Operation of the illuminant source 160 by the controller 150 may proceed according to certain sequenced control functions 158, 159 so as to provide, for example, controlled operation of the illuminant source 160 to afford a field of illumination that varies according to selective characteristics such as: sequential or simultaneous activation and deactivation of selected illuminants, each having a predefined spectral power distribution; controlled variation of the intensity of selected illuminants; or for interactive control according to intervention by an operator of the particular sequence, intensity, or duration of the illuminants. As noted above, the rendered composite image may be constructed to have a plurality of source images encoded therein; for example, of at least first and second patterns of respective first and second colorants. The rendered composite image may be subjected to a temporal sequencing of illumination by respective first and second narrowband illuminants, thus allowing a respective one of the first and second recovered source images 171, 172 to be sequentially distinguishable.